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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 5 : F01N 3/28 — A1

(11) International Publication Number: WO 91/19081

(43) International Publication Date: 12 December 1991 (12.12.91)

(21) International Application Number: PCT/GB91/00760

(22) International Filing Date: 14 May 1991 (14.05.91)

(30) Priority data:
9011849.8 26 May 1990 (26.05.90) GB

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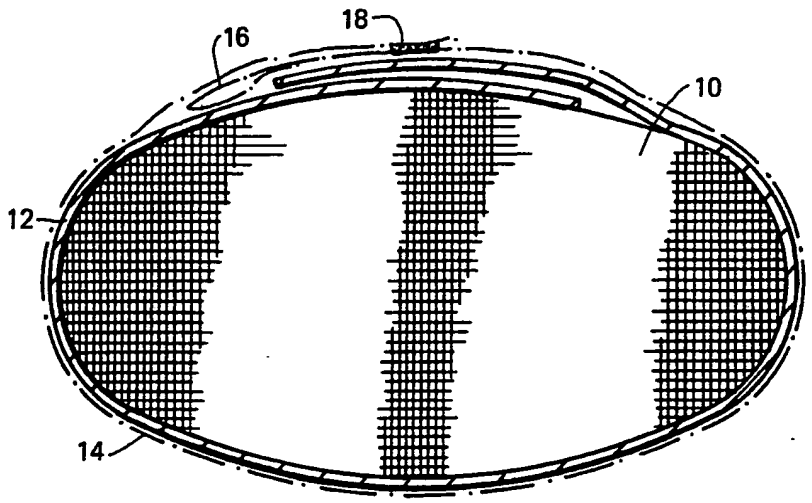
(81) Designated States: AT, AT (European patent), AU, BB, BE (European patent), BF (OAPI patent), BG, BJ (OAPI patent), BR, CA, CF (OAPI patent), CG (OAPI patent), CH, CH (European patent), CI (OAPI patent), CM (OAPI patent), DE, DE (European patent), DK, DK (European patent), ES, ES (European patent), FI, FR (European patent), GA (OAPI patent), GB, GB (European patent), GR (European patent), HU, IT (European patent), JP, KP, KR, LK, LU, LU (European patent), MC, MG, ML (OAPI patent), MR (OAPI patent), MW, NL, NL (European patent), NO, PL, RO, SD, SE, SE (European patent), SN (OAPI patent), SU, TD (OAPI patent), TG (OAPI patent), US.

Published
With international search report.
Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.

(54) Title: CATALYTIC CONVERTERS



(57) Abstract

A catalytic converter block (10) is firstly wrapped with a layer of fibrous material (12) and then by a sheet of plastics material (14) under tension. Overlapping ends of the sheet of plastics materialare adhered together.

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Title: Catalytic Converters

DESCRIPTION

This invention concerns catalytic converters principally for motor vehicles.

Catalytic converters are used for treatment of exhaust gases from motor vehicle engines to render them substantially harmless before emission to atmosphere. Treatment is by passing the exhaust gases through a chamber enclosing a porous ceramic block whose pores are coated with a suitable catalyst.

The ceramic block is contained in a chamber formed from two half shells welded together at their edges, the chamber having an inlet and an outlet. The block is wrapped in fibrous material in order to insulate it from colder temperatures outside the converter, to provide sound proofing and to cushion the ceramic block against expansion and contraction of the chamber.

A commonly use fibrous material is that sold under the trade name SAFFIL which is 95% alumina and provided as a low density mat. Proposals have been made in U.K. Patent applications Nos. 2171180A and 2205929A for methods of wrapping ceramic blocks to facilitate fitting of same in catalytic converters.

These methods have proved to be acceptable in most areas but the presence of several layers of plastics material around and between layers of the fibrous material is seen as a possible source of contamination of the fibrous material that could impair its effectiveness.

An aspect of this invention is to provide a way of installing fibrous material about catalytic converters so that the above-mentioned problems are overcome or at least mitigated.

According to this invention there is provided a method of protecting and insulating a catalytic converter block comprising wrapping said block in at least one layer of a mat of fibrous material and wrapping the at least one layer of fibrous material with plastics material under tension.

Preferably a sheet of plastics material overlaps itself or ends thereof overlap an underlying sheet of plastics material. In one preferred embodiment of the invention the sheet of plastics material overlaps itself to a relatively minor extent, whereby overlapping ends can be adhered together after a desired tension for the sheet has been reached. In a preferred embodiment tension will be applied to the plastics sheet by applying a force to one end of the sheet whilst the other end is held or by applying force simultaneously to

both ends of the sheet in opposite directions. One preferred proposal of the invention may be to form a loop in one or both ends of the plastics sheet in which a bar, rod or the like can be inserted. Force is then applied to the ends of the bar, rod or the like in the desired direction. The loop may be formed by folding over the end of the sheet and adhering it to itself such as by means of double-sided adhesive tape or some other adhesive such as a moisture cured adhesive, say of the cyanoacrylate type, or a U.V. curable adhesive, which may be spray or drop applied. It may even be possible to form the loop by hot welding.

Once the plastics sheet has been tensioned it may be adhered to itself using any suitable means, such as for example using double-sided adhesive tape or some other adhesive, such as a moisture cured adhesive, say of the cyanocrylate type, or a U.V. curable adhesive, which may be of spray or drop applied. Hot welding may be another possibility for adhering the overlapped ends of the plastics sheet together.

When the plastics sheet is being supplied from a roll, it will be appreciated that only a tensioning loop need be formed in the free end of the plastics sheet, its other end being effectively anchored by being joined to the roll. It is envisaged that may well be the case for automated implementation of the method of the

invention.

In another preferred embodiment of the invention, a relatively narrow strip of plastics material is positioned on the fibrous material and the plastics sheet wrapped around the fibrous material under tension so that opposite ends thereof overlap the narrow strip, said opposite ends then being adhered to the relatively narrow strip by any suitable means. In this embodiment, the ends of the sheet of plastics material do not overlap each other.

The preferred material used in the invention should have sufficient strength to withstand the required tensioning as should any adhesive used. Particularly suitable plastics material for use in the present invention will be those based on carbon and hydrogen only and possibly also on oxygen. Polypropylene and polyesters have been found to be especially suitable as the plastics material for use in the invention.

The fibrous material will preferably be overlapped at its ends, preferably over a flatter surface of the catalytic converter block. (Most catalytic converter blocks have an oval cross section). It may be advantageous to provide a separate pad to give extra thickness of fibrous material on the opposite flatter surface of the block. Such an arrangement

means that the thickness of fibrous material is less at the more curved ends of the block so that there is less likelihood of fibrous material being trapped between half shell edges of a catalytic converter as they are pressed together for welding.

The invention also comprehends a catalytic converter block wrapped in accordance with the invention as well as a catalytic converter comprising a wrapped catalytic converter block.

The invention will now be further described, by way of example only, with reference to the accompanying drawings, in which:-

Figure 1 shows schematically a first stage for wrapping a catalytic converter block with fibrous material;

Figure 2 shows schematically a second stage for wrapping a catalytic converter block with fibrous material;

Figure 3 shows schematically a final stage for wrapping a catalytic converter block; and

Figure 4 shows schematically an alternative method of wrapping a catalytic converter block.

Referring to the accompanying drawings, an oval section catalytic converter block 10 of the type usually housed in metal half shells welded together is firstly wrapped with a layer 12 of fibrous material, typically

SAFFIL, so that it overlaps on a flatter section of the block. Then, a sheet 14 of polypropylene is wrapped around the fibrous material under tension and overlapped ends thereof adhered together to give a final product as shown in Figure 3.

The method of wrapping the plastics sheet involves the following steps. The width of the film is equal to the length of the converter block and the length is approximately one and a quarter times the outer circumference of the cover. Each end of the sheet is folded over to form a loop 16 and adhered to the main part of the sheet, for example, by double-sided adhesive tape, moisture curable adhesive, U.V. curable adhesive or by welding. As shown both ends of the sheet 14 are looped but, for example in an automated system, the plastics sheet will be fed off a roller so no loop will be required at that end of the sheet, for reasons which will become apparent below.

A strip 18 of double-sided adhesive tape is fixed across the plastics sheet 14 just prior to the left hand loop, as seen in the drawing, backing strip being left on. The spare backing strip is folded back onto the tape but projecting slightly.

Then, a flat metal bar 20 is inserted into each loop 16 and, after wrapping the block with the required fibrous material firmly but not necessarily with great

tension, the plastics sheet is wrapped around the fibrous material and overlapped at its ends. The ends of the bars 20 are engaged by hydraulic cylinder (not shown) and tension applied to force the bars away from each other in order to compress the fibrous material. It should be noted that the loops 16 are formed by turning the free ends of the plastics sheet 14 over to be on the opposite faces of the sheet 14 to those between which an adhesive bond is to be formed. Once the desired tension has been reached, the backing strip is removed from the tape 18 and radial pressure applied to adhere the plastics sheet to itself in an overlapping relationship. Obviously, when the plastics sheet is supplied off a roll, that will act as an anchor and only force need be applied to the other end of the sheet to achieve the required tension.

The bars 20 are then removed and excess plastics sheet and fibrous material trimmed away.

Alternatively, a curable adhesive may be applied in place of the double-sided adhesive tape at 18. Such an adhesive can be moisture curable, say of the cyanoacrylate type, or U.V. curable. Also, the loops 16 may be formed without the need for adhesive or, indeed, the ends of the plastics sheet may be gripped in some way in order to apply tension thereto.

It will be appreciated that although the method

steps have been described in a particular order, that order may be altered to suit particular circumstances, such as if the method is to be carried out automatically on suitable machinery. Furthermore, it will be appreciated that, whilst the invention has been described particularly in respect of wrapping catalytic converter blocks, the method of the invention may be suitable for other wrapping applications.

Turning to Figure 4 of the accompanying drawings, which shows an alternative method of wrapping a converter block 10, the block 10 is wrapped with a layer 12 of fibrous material, as before, under tension and with its ends overlapped. A relatively narrow strip 30 of plastics material is laid over the overlapped region of the fibrous material 12. Then a sheet 32 of plastics material is wrapped around the block 10 and at each end passed over rollers 34. The rollers 34 are arranged to be movable towards each other to apply tension to the sheet 32 along with tension applied to each end of the sheet 32. Adhesive, such as of the moisture cured type is applied to the strip 30 at 36 and the tensed sheet 32 brought down onto the adhesive to fix it in place under tension to complete the wrapping of the block 10. Finally, the surplus ends of sheet 32 are cut off.

CLAIMS

1. A method of protecting and insulating a catalytic converter block comprising wrapping said block in at least one layer of a mat of fibrous material and wrapping the at least one layer of fibrous material with plastics material under tension.

2. A method as claimed in claim 1, wherein a sheet of plastics material overlaps itself.

3. A method as claimed in claim 2, wherein the sheet of plastics material is overlapped on itself to a relatively minor extent under tension and the overlapping ends are adhered together.

4. A method as claimed in claim 2 or 3, wherein a force is applied to one end of the plastics sheet whilst the other end is held.

5. A method as claimed in claim 2 or 3, wherein force is applied to both ends of the sheet.

6. A method as claimed in any one of claims 2 to 5, wherein one or both of the ends of the plastics sheet is or are formed into a loop into which a bar, rod or the like can be inserted and to which a force can be applied.

7. A method as claimed in claim 6, wherein a loop is formed by folding over an end of the sheet of plastics material and adhering it to itself.

8. A method as claimed in claim 1, wherein ends of a sheet of plastics material overlap an underlying sheet of plastics material.

9. A method as claimed in claim 8, wherein a relatively narrow strip of plastics material is positioned on the fibrous material and the plastics sheet wrapped around the fibrous material under tension so that the ends of the plastics sheet overlap the narrow strip and said ends are adhered to the narrow strip.

10. A method as claimed in any one of claims 1 to 9, wherein the plastics material is based on carbon and hydrogen only.

11. A method as claimed in claim 10, wherein the plastics material is polypropylene.

12. A method as claimed in any one of claims 1 to 9, wherein the plastics material is based on carbon, hydrogen and oxygen only.

13. A method as claimed in claim 12, wherein the plastics material is a polyester.

14. A method as claimed in any one of claims 1 to 13, wherein the fibrous material is overlapped on a flatter surface of the catalytic converter block.

15. A method of protecting and insulating a catalytic converter block substantially as hereinbefore described with reference to and as illustrated in Figures 1 to 3

or Figure 4 of the accompanying drawings.

16. A catalytic converter block wrapped by a method as claimed in any one of claims 1 to 15.

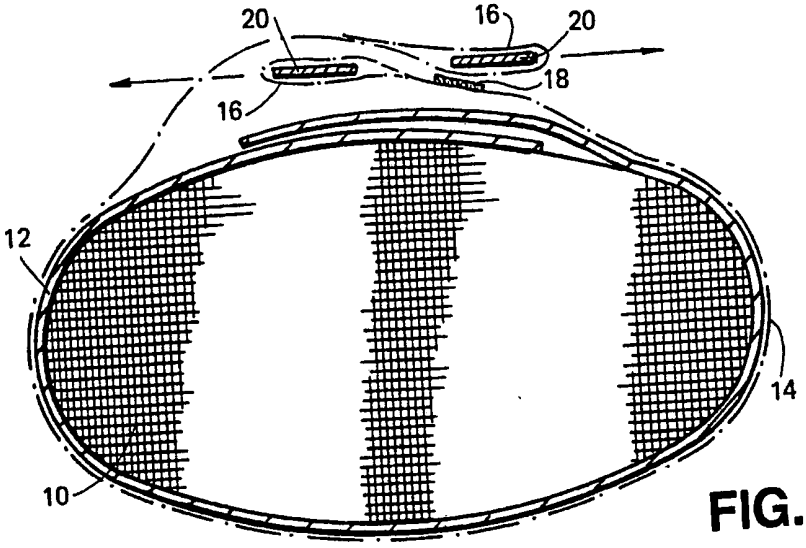

FIG. 1

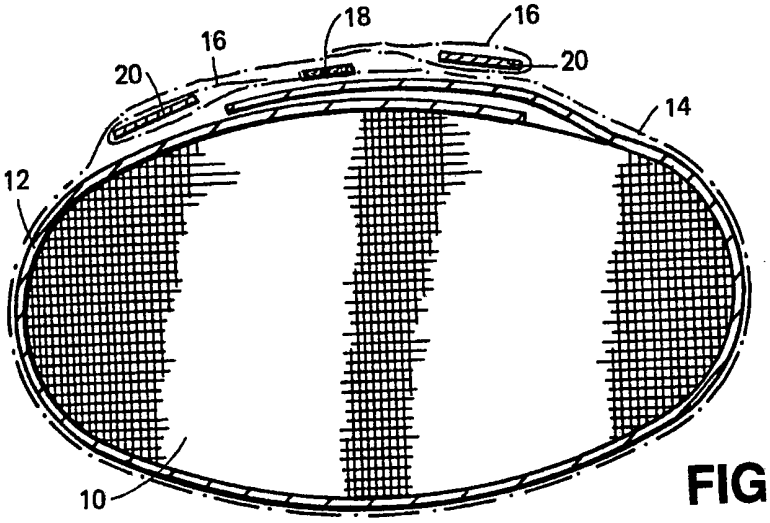

FIG. 2

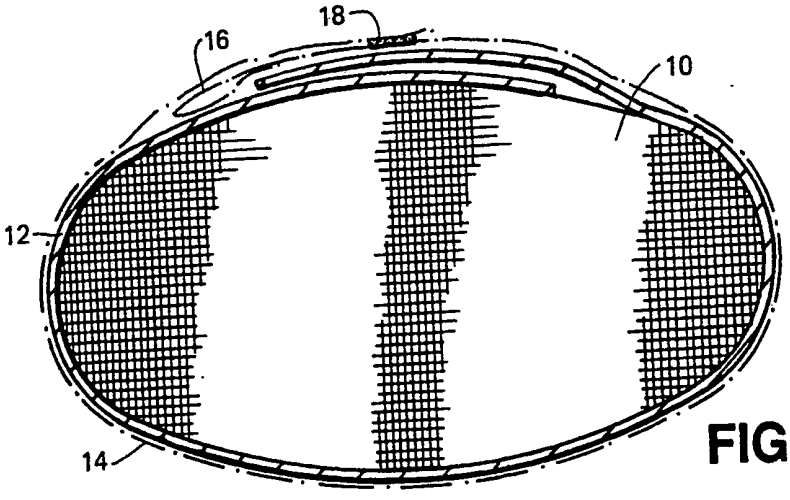

FIG. 3

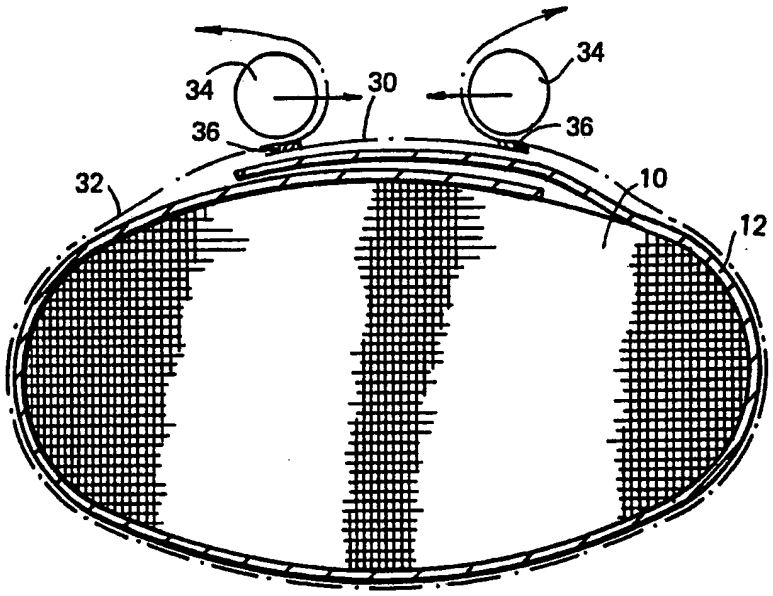

FIG. 4

INTERNATIONAL SEARCH REPORT

PCT/GB 91/00760

International Application No

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all)[6]

According to International Patent Classification (IPC) or to both National Classification and IPC

Int.Cl. 5 F01N3/28

II. FIELDS SEARCHED

Minimum Documentation Searched[7]

Classification System	Classification Symbols
Int.Cl. 5	F01N ; F16L

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched[8]

III. DOCUMENTS CONSIDERED TO BE RELEVANT[9]

Category °	Citation of Document,[11] with indication, where appropriate, of the relevant passages[12]	Relevant to Claim No.[13]
A	GB,A,2 205 929 (FIBRE TECHNIQUES) December 21, 1988 cited in the application see page 8, line 2 - page 10, line 21; figures 1-4	1-4,10, 11,14
A	FR,A,2 213 413 (BRITISH LEYLAND MOTOR CORPORATION) August 2, 1974 see page 2, line 21 - page 4, line 1; figures 1-4	1
A	EP,A,0 074 220 (LANCASTER GLASS FIBRE) March 16, 1983	
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IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
25 SEPTEMBER 1991	10. 10. 91
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ANNEX TO THE INTERNATIONAL SEARCH REPORT ON INTERNATIONAL PATENT APPLICATION NO.

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